

## A new species of *Rimicaris* (Crustacea: Decapoda: Bresiliidae) from the Snake Pit hydrothermal vent field on the Mid-Atlantic Ridge

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*Abstract.*—A second species of the bresiliid shrimp genus *Rimicaris* Williams & Rona, 1986, *R. aurantiaca*, is described from the Snake Pit hydrothermal vent field on the Mid-Atlantic Ridge. The species possesses a highly unusual dorsal light receptive organ (the “dorsal eye”) beneath the carapace, as does *R. exoculata* Williams & Rona, 1986, but is considerably smaller than that species and in many ways bridges the morphological gap between the genera *Rimicaris* (previously monotypic) and the genus *Chorocaris* Martin & Hessler, 1990. Characters in common with *R. exoculata* include the presence of the dorsal eye, lack of a well developed carpal cleaning brush on the cheliped, smooth (not notched) lateral border of the antennal scale, and brush-like pad of setae on the dactylus of the second maxilliped. Characters in common with species of *Chorocaris* include the relatively normal (not inflated) carapace, slightly produced rostrum, presence of recognizable eyestalks, and absence of a carapacial notch at the base of the antennal area that forms, with the carapace, an opercular shield such as is seen in *R. exoculata*. Previous descriptions of the dorsal eye of *R. exoculata* show that it differs from the dorsal eye of *R. aurantiaca*. The new species is also characterized by the presence of large numbers of orange-colored oil droplets visible through the dorsum of the carapace and through the thin cuticle of the abdominal sternites and, to a lesser degree, through the cuticle of the abdominal terga. The definition of *Rimicaris* is revised to accommodate the new species.

The Snake Pit hydrothermal vent fields along the Mid-Atlantic Ridge (23°20.3'N, 45°0.5'W), the ecology of which has been reviewed recently by Van Dover (1995), are known to harbor several species of bresiliid shrimps (Galkin & Moskalev 1990, Segonzac 1992, Segonzac et al. 1993, Van Dover 1995). Several visits to the site by French and American scientists beginning in 1988 have resulted in the collection of at least four species of bresiliids, only three of which, *Rimicaris exoculata* Williams & Rona, 1986, *Chorocaris chacei* (Williams & Rona, 1986), and *Alvinocaris markensis* Williams, 1988, have been described (Van Dover 1995). The fourth species, a small,

previously undescribed, orange shrimp, was the subject of a recent and detailed anatomical study to investigate its retinal anatomy (Nuckley et al. 1996). The new species was referred to in that study as *Rimicaris* sp., primarily on the basis of ecological and neuroanatomical and retinal similarities between it and the previously described and co-occurring *R. exoculata*. Differences between this new species and others at the site had been noted earlier, but had been attributed to ontogenetic differences. The smaller orange shrimp were thought to be either juveniles of *R. exoculata* or members of an undescribed species of *Chorocaris*. Some of the ecological observations on these spe-

cies can be found in Segonzac (1992) and Segonzac et al. (1994), as well as in Nuckley et al. (1996), and additional ones are presented here.

Cruise 129-7 of the R/V *Atlantis II* in May 1993 resulted in the return of several lots of bresiliids, including the new species described herein, collected using the DSRV *Alvin*. Some of these specimens were sent to us for identification and form the basis of the following description.

### Materials and Methods

Specimens came from a single collection made by the DSRV *Alvin*, R/V *Atlantis II* cruise 129-7, 19 Jun 1993, Dive 2618, 3520 m, Snake Pit hydrothermal vent field (Moose vent [l'Elan] site), Mid-Atlantic Ridge, 23°22.1'N, 44°57.0'W (Nuckley et al. 1996). Segonzac et al. (1993) give the following coordinates for the Snake Pit hydrothermal area: 23°22'N–44°56'W (the Snake Pit "segment" extends some 40 km; Van Dover 1995). The lot contained 20 adults, 18 of which constitute the type series (holotype and 17 paratypes) and are housed in the Natural History Museum of Los Angeles County (LACM). Additional specimens mentioned by Nuckley et al. (1996) were collected on *Alvin* dives 2613 and 2623. Some of these specimens are housed at Syracuse University pending further neurological and physiological study, while others are in the possession of the Chief Dive Scientist, C. L. Van Dover. Additional specimens are undoubtedly among the extensive collections made by the French submersible *Nautilie* during the *Hydrosnake* cruise in June of 1988 (see Segonzac et al. 1993) but have not been examined by us. Most specimens were initially fixed in buffered formalin and later transferred to 70% EtOH. Some specimens were kept alive and maintained for over 2 weeks at sea (see Nuckley et al. 1996) during which time behavioral observations were made; however, all specimens sent to us had been immediately preserved on

board the support ship R/V *Atlantis II* and later transferred to 70% ethanol. Drawings were made with the use of a Wild M5APO dissecting stereoscope and a Nikon Labophot compound binocular microscope. SEM preparation involved dehydration through a graded ethanol series, drying via HMDS (Nation 1983), and sputter coating with gold prior to examination with a Cambridge 360 Stereoscan at the Center for Electron Microscopy and Microanalysis on the University of Southern California campus. Two specimens of nearly identical size were destroyed for SEM work (Fig. 5).

### Genus *Rimicaris* Williams & Rona, 1986

*Emended diagnosis*.—Bresiliid with eyestalks greatly reduced or nearly absent, connected medially. Visual apparatus highly modified as bilobed organ extending posteriorly beneath transparent cuticle of carapace. Carapace spineless, greatly inflated laterally or normal (not inflated). Rostrum absent or present; if present then rounded and short, barely extending over (nonfunctional) eyestalks. Antennal scale broadly oval with margins smooth, entire, lacking distolateral notch or groove and its blunt spine. Dactylus of second maxilliped with medially-directed brush of evenly sized setae. Chelipedal carpus without well developed carpal cleaning brush. Pleurobranch gills on pereopods 1–5, arthrobranch gills on maxilliped 3 and on pereopods 1–4. Pereopods lacking exopods.

Type species: *Rimicaris exoculata* Williams & Rona, 1896, by monotypy.

### *Rimicaris aurantiaca*, new species Figs. 1–5

*Chorocaris chacei* (juveniles). Segonzac et al., 1993: 540 and addendum. (Not *Chorocaris chacei* Williams & Rona, 1986).

?*Chorocaris* n. sp. Van Dover 1995: 259 (table).

"Small shrimp with an orange coloration" Creasey et al. 1996: 474. (Not their *Chor-*

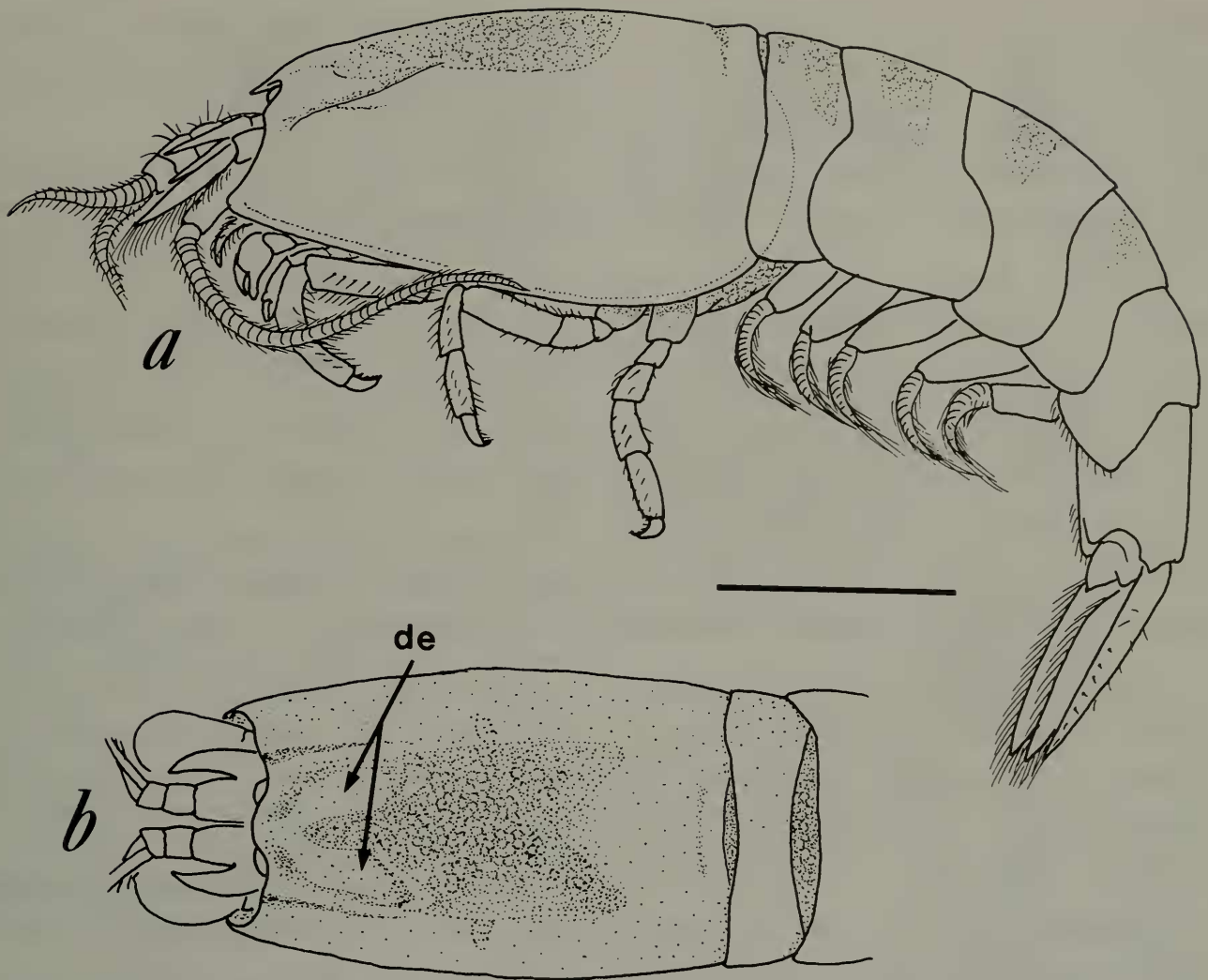


Fig. 1. *Rimicaris aurantiaca*, new species, female holotype, LACM 93-46.3, total length 24.4 mm. a, lateral view; b, paratype, 9.7 mm carapace length (23.5 mm total length), carapace and first and part of second abdominal somite, dorsal view, de, bilobed dorsal eye. Stippled areas at top of carapace and just anterior to sternite of first abdominal somite (posterior to coxa region of pereopod 5) and dorsal regions of abdominal somites indicate regions where orange-colored oil droplets are visible through the thin and transparent cuticle. Scale bar = 5.0 mm.

*ocar* sp., = *C. fortunata* Martin & Christiansen, 1995).

*Rimicaris* sp. Nuckley et al. 1996:98.

**Material studied.**—Holotype female, LACM 93-46.3, total length 24.4 mm, R/V *Atlantis II* cruise 129-7, 19 June 1993, DSRV *Alvin*, Dive 2618, 3520 m, Snake Pit hydrothermal vent field (Moose vent [l'Elan] site), Mid-Atlantic Ridge, 23°22.1'N, 44°57.0'W. Paratypes, 17 adults, same collection data, Natural History Museum of Los Angeles County, LACM 93-46.2.

**Description.**—Integument smooth, thin, regularly punctate, transparent on small

area on dorsum of carapace (Fig. 1a, b, 2a), on swollen area just posterior to coxa of fifth pereopods and anterior to first abdominal sternite, and to lesser degree on lateral and dorsal surfaces (terga) of abdominal somites; transparent areas appearing orange due to presence of orange-colored oil droplets below surface of cuticle.

Carapace (Fig. 1a, b, 2a, b) stout, wide, robust, with semitransparent area dorsally through which dorsal eye and many orange-colored oil droplets can be seen. Branchiostegal border produced beyond extent of rostrum. Rostrum short, wide, rounded, produced anteriorly beyond and covering

central connected region of eyestalks, extending forward to point just beyond anteriormost part of antennal region of carapace. Antennal spine absent. Branchiostegal region with slight indentation continuing as sinuous indentation or groove posteriorly and dorsally.

“Normal” (frontal) eyes (Fig. 2a) reduced, not pigmented; nonfaceted externally but with internal faceting barely visible; eyestalks connected transversely to one another beneath rostrum, just visible in lateral and dorsal views, not extending anteriorly to tip of rostrum. Small spherical clear bump on each eyestalk laterally under rostrum and also single bump projecting slightly from median indentation between eyestalks (Fig. 2a).

Dorsal eyes (Fig. 1b, 2a) paired, paddle-shaped lobes, terminally (posteriorly) rounded or gently angled, extending backward perhaps 1/5 to 1/4 length of carapace, reflective, bright white in life (Nuckley et al. 1996).

Antennules (Fig. 2a–c) well developed, lengths of peduncular articles increasing in order  $1 > 2 > 3$ ; third article markedly longer on medial than lateral side. Basal article stout, bearing longitudinal row of setae and with curved setose ridge extending from base of stylocerite to groove between stylocerite and basal article. Stylocerite (Fig. 2c) strong, reaching to distal edge of second peduncular article on medial side, gently curved on lateral side but nearly straight to only slightly curved along medial border. Flagella inserted side by side but usually with lateral flagellum crossing over medial flagellum, which curves downward and backward. Peduncular and flagellar articles with setae as illustrated.

Antennae (Fig. 1a, 2b, d, e) with thick, stout peduncular articles. Flagellum usually sweeping backward, ranging in length from slightly shorter to slightly longer than carapace length. Antennal scale (Fig. 2d, e) large, broadly oval, setose only along medial and distal border, with supportive longitudinal dorsal ridge and lacking notch

along distolateral border. Base of antennal scale and peduncle (Fig. 2e) not forming groove to receive leading edge of carapace border.

Mandibles (Fig. 3a, b) with 2-segmented palp; first segment with 1 long plumose seta on distodorsal border; second segment heavily setose. Cutting edge (incisor process) gently tapering, slightly produced, with 5–6 small sharp teeth giving way to row of smaller teeth along descending (ventral) border. Posterior tooth (molar process) blunt, simple, divergent from incisor process.

Maxillule (Fig. 3c) with palp well developed, incipiently bilobed, bearing 2 small distal short setae and 1 longer, plumose subterminal seta. Basal endite stout, curved strongly inward, with innermost setae in well defined row sweeping backward and inward, and with setae around distal and medial borders. Proximal endite large, narrow basally (at point where palp is attached) but expanded distally and bearing some 20 to 30 stout spines along medial border.

Maxilla (Fig. 3d) with endites reduced, nearly obsolescent. Basal endite composed of 2 roughly similar setose lobes; distal endite narrow basally and expanded distally, fringed with setae. Palp narrow, following curve of dorsal edge of distal endite. Scaphognathite large, flattened, bearing densely plumose setae on all borders, expanded distally, giving rise at posterior terminus to many long, stout, microscopically serrate setae that we presume sweep over and clean gill surfaces in life. Blade with scattered short setae.

First maxilliped (Fig. 3e) reduced, with components nearly completely fused into flattened, triangular, phylliform limb; basal and distal endites setose; palp narrow, extending beyond endites. Epipod short, stout, incipiently bilobed, with anterior dorsal bulge and posteroventral triangular terminus.

Second maxilliped (Fig. 3f) flattened but becoming pediform, composed of 5 heavily

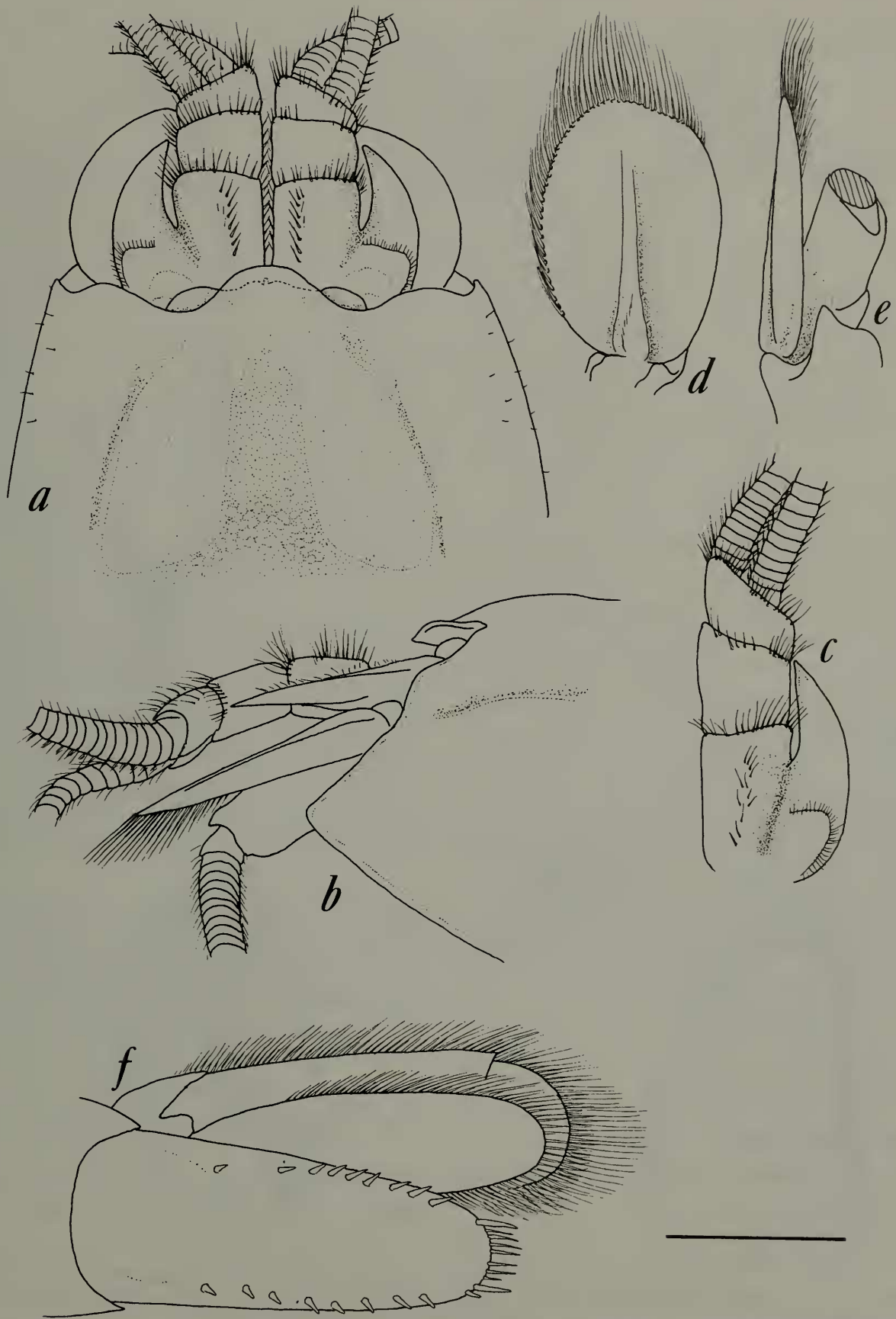


Fig. 2. *Rimicaris aurantiaca*, new species, female holotype, LACM 93-46.3. a, frontal region, dorsal view; b, left frontal region, lateral view; c, base of right antennule and its stylocerite, dorsal view; d, right antennal scale, dorsal view; e, same, lateral view; f, telson and right uropods, dorsal view. Scale bar = 2.0 mm.

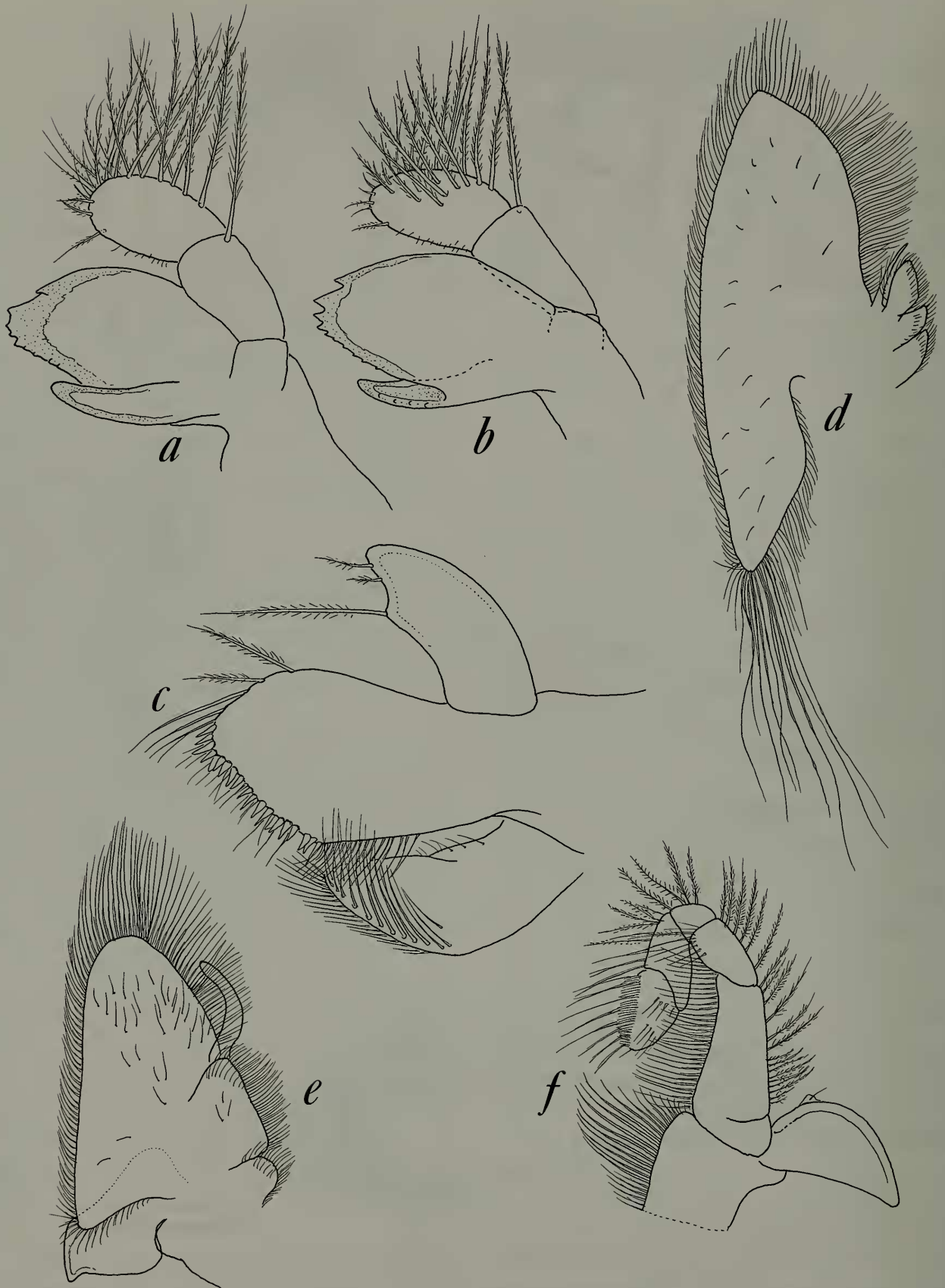


Fig. 3. *Rimicaris aurantiaca*, new species, female holotype, LACM 93-46.3. a, b, right and left mandibles; c, maxillule; d, maxilla; e, first maxilliped; f, second maxilliped. Not drawn to scale.

setose articles. Dactylus with distinct row of short, evenly-sized setae forming brush along medial edge. Epipod strongly arched dorsally, with small protruberance at apex of arch.

Third maxilliped (Fig. 4a, b, 5a, b) pediform, composed of 2 short proximal articles and 3 longer more distal articles; basalmost of 2 proximal articles bearing arthrobranch and small bilobed epipod. Distal 3 articles (articles 3, 4, and 5, numbered proximal to distal) differing in length such that  $3 > 5 > 4$  (with 5 being distalmost article, presumably dactylus or fused dactylus + propodus). Distal 2 articles with well developed rows of stout setae (Fig. 4b); dactylus with stout spines distally. Distal spines and setae including variety of serrate, stout, plumose, and other types of spines and setae (Fig. 5a, b).

Pereiopod 1 (Fig. 4c, d) short, stout, appearing slightly twisted. Chela stout, curved downward and inward; movable finger (dactylus) approximately  $\frac{3}{4}$  length of propodus, and bearing comb row of minute spines along cutting edge. Carpus expanded distally, lacking well developed cluster of cleaning spines or setae at distoventral border.

Pereiopod 2 (Fig. 4e, f, 5c) slender, approximately equal in length to pereiopod 1. Chela with row of spines on cutting edges of dactylus and propodus; these spine rows on each finger terminating in long spine directed toward opposing finger; spines overreaching opposing finger when closed (Fig. 4f, 5c). Length of dactylus approximately half that of propodus.

Pereiopods 3–5 (Fig. 4g) stout, similar to one another, slightly increasing in length from P3 to P5. Propodus with transverse rows of setae along ventral border. Dactylus short, stout, recurved, bearing numerous distal and ventral spines (Fig. 4h, 5d), and with distinct basal keel nearly obscured by protruding spines of propodus (Fig. 5e). Coxae of P5 with small, ventrally- and slightly anteriorly-directed spine between them (Fig. 4i, 5f); spine more or less

straight on ventral border but bulging upward (toward body) along anterodorsal border (Fig. 4i).

Pereiopods lacking exopods.

Gill formula: pleurobranchs on pereiopods 1–5, arthrobranchs on maxilliped 3 and on pereiopods 1–4.

Abdomen (Fig. 1a) gently curving to nearly straight behind carapace. Abdominal pleura of somite 2 expanded and covering those of somites 1 and 3; posteroventral borders of pleura of somites 2–5 becoming increasingly acute from somite 2 to somite 5, but always smooth edged, lacking denticles or serrations.

Telson (Fig. 2f) with 8 or 9 spines on each side in row beginning at proximal fourth of telson and extending posteriorly and laterally; progressively more posterior spines directed more laterally than dorsally. Extremity of telson with pair of heavy spines flanking row of shorter and thinner spines and setae. Uropods elongate, oval, lower branch with well developed diaeresis; both rami heavily setose.

*Measurements in mm.*—Total length of the 20 specimens examined (including the holotype) ranged from 21.5 to 26.8 mm.

*Color.*—In life the species is bright orange to reddish orange, with the ocular region reflecting light and appearing either gray or bright white (Nuckely et al. 1996: 101, figs. 2B, C), depending upon the angle of reflected light. Storage in ethanol causes these colors to fade, although a light orange color of the carapace and abdomen was still detectable some 28 months after preservation. Most obviously pigmented are the areas where the cuticle is more transparent; these include an oval region on the dorsal surface of the carapace that also contains the ocular apparatus (Fig. 1b), a slightly ventrally protruding area of the sternal cuticle just posterior to the fifth pereiopods and anterior to the first abdominal somite, and to a lesser extent the dorsal and lateral surfaces of each abdominal somite. Through each of these areas small orange-

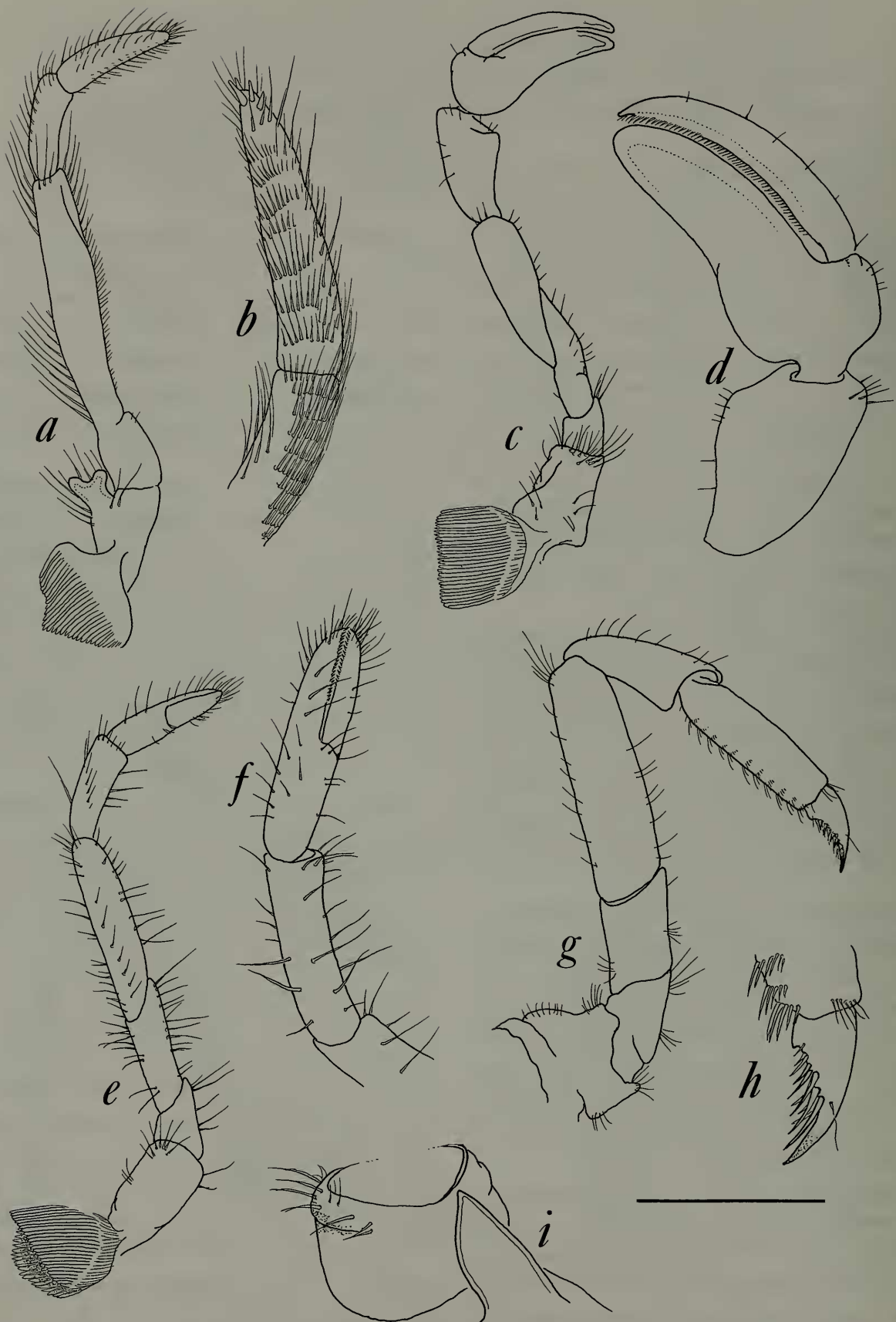


Fig. 4. *Rimicaris aurantiaca*, new species, female holotype, LACM 93-46.3. a, right third maxilliped, lateral view; b, magnified view of same, medial view; c, right pereopod 1 (cheliped), lateral view; d, higher magnification of same, medial view; e, pereopod 2; f, same, higher magnification of chela and carpus; g, right pereopod 3, lateral (posterior) view; h, same, higher magnification of dactylus. Scale bar = 2.0 mm (a, c, e, g), 1.0 mm (b, d, f, h, i).



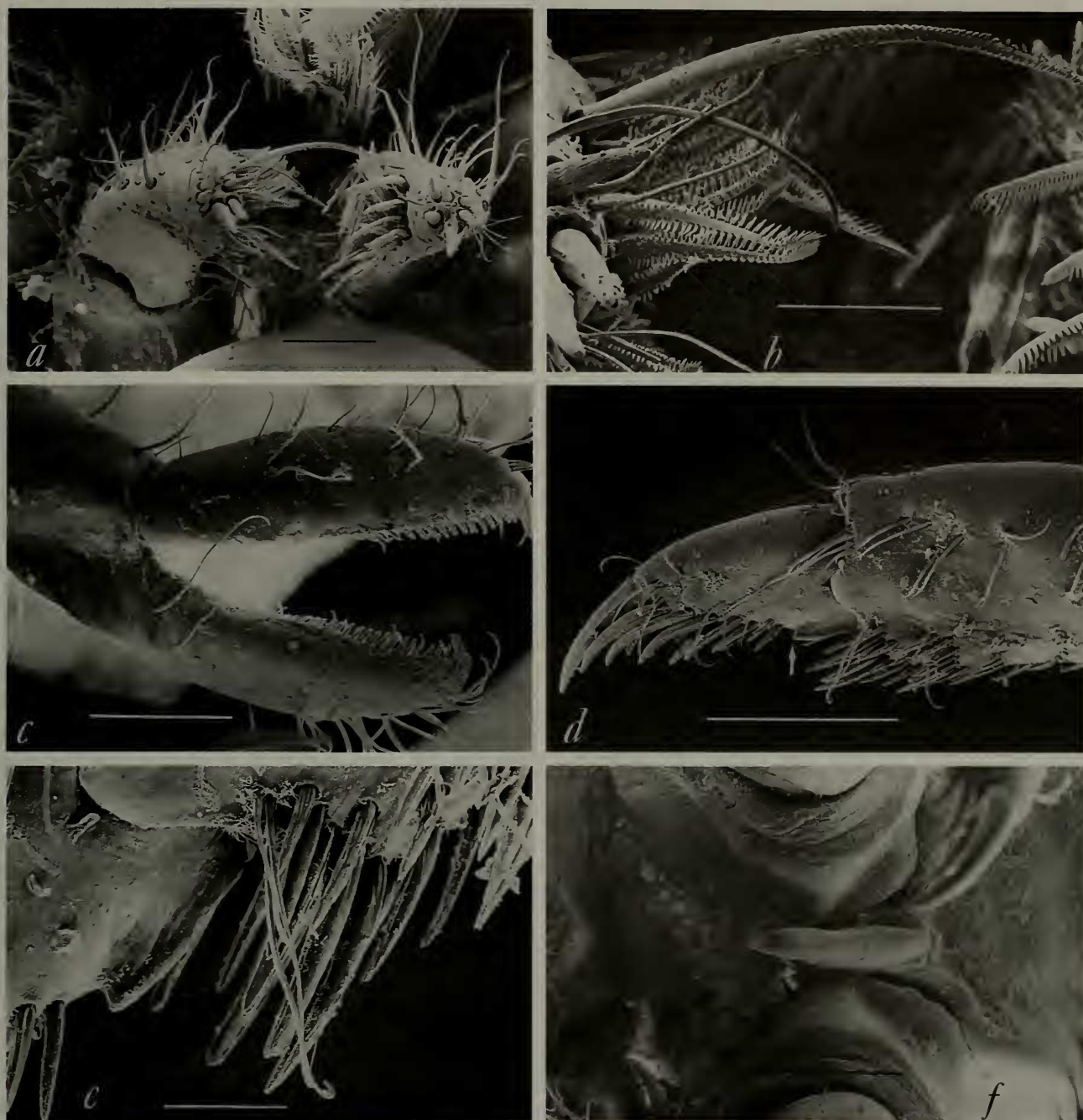


Fig. 5. *Rimicaris aurantiaca*, new species, selected SEM images. a, b, distalmost article of third maxilliped, showing diversity of setal and spine types; c, chela of right pereopod 2 (note long spine at tip of each finger); d, dactylus and part of propodus of left pereopod 4, lateral view; e, same, higher magnification of ventral keel (arrow in d). f, spine between coxae of pereopod 5, anterior is toward left of photograph. Scale bars: = 200  $\mu$ m (a, c), 100  $\mu$ m (b, e), and 500 (d, f). Sizes in mm of the two specimens used in these photographs were as follows: carapace length = 10.1, total length = 26.7, carapace width = 5.4 for the larger; carapace length = 9.5, total length = 26.1, carapace width = 5.2 for the smaller.

colored oil droplets are visible even in preserved specimens.

*Etymology.*—The specific name is from the adjectival and feminine form of *aurantium*, a Neolatin neuter noun meaning orange (Brown 1955: 207). This choice of epithet is in reference to the distinctive coloration of this species in life. The name also honors

Syracuse University, students and alumni of which are nicknamed the “Orangemen,” where the original research on the fascinating visual components of the new species was completed at the Department of Bioengineering and Neuroscience and at the Institute of Sensory Research (e.g., O’Neill et al. 1995, Nuckley et al. 1996).

*Remarks.*—The details of the unique “enlarged dorsal eye specialized for detecting light in a very dim environment instead of the expected compound eye” possessed by this species have been presented by Nuckley et al. (1996). This organ is visible in life (see color photographs in Nuckley et al. 1996) as a branched lobe extending backward from the front of the carapace, and just below the surface of the carapace, with each lobe being paddle-shaped and posteriorly rounded. This organ in *R. aurantiaca* differs from that in *R. exoculata* in that in the latter species it is considerably more elongate (e.g., Van Dover et al. 1989).

### Discussion

It is reassuring to find that previously noted differences in neuroanatomy, physiology, and ecology are in agreement with taxonomic separations based on morphological characters. Nuckley et al. (1996), based primarily on the details of the unusual visual apparatus, referred to this new species as *Rimicaris* sp., feeling that it was more similar to *R. exoculata* than to any described species of the closely related genus *Chorocaris*. They also commented on ecological differences between *Chorocaris* and *Rimicaris*, noting that *Rimicaris* sp. (now *R. aurantiaca*, new species) occurs in dense swarms at the vent site, as does *R. exoculata*, whereas no species of *Chorocaris* exhibits this behavior, or at least not to this degree. The new species shares with *R. exoculata* the highly unusual dorsal eye, with very similar retinal anatomy (O'Neill 1995, Nuckley et al. 1996, S. Chamberlain, pers. comm.). Although species of *Chorocaris* share some of the same visual components, there are important neuroanatomical differences, the most salient of which is that the visual array is always oriented anteriorly (rather than dorsally) in all species of *Chorocaris* examined to date (Kuenzler et al. 1997), whereas both *R. exoculata* and *R. aurantiaca* have a dorsally directed visual array that receives input through the

cuticle of the shrimp's carapace (Kuenzler et al. 1997, and S. Chamberlain, pers. comm.). This difference may be tied to the observed differences in behavior. Shrimp capable of receiving optical input only from the anterior end, which could be blocked by swarming behavior, might be less likely to exhibit swarming than would a species with a dorsal eye, where optical input might be obstructed to a somewhat lesser degree by swarming.

The new species also shares with *R. exoculata* some small but significant external morphological details, such as an antennal scale that has a smooth (unnotched) border on its anterolateral margin, a cheliped carpus lacking a well developed cleaning brush (i.e., with at most two or three setae in the location where such a brush is found in other carideans, including all known species of *Chorocaris*; Martin et al. unpublished data), and a distinctive brush-like pad of setae on the distal segment of the second maxilliped (see also Van Dover et al. 1988). This last character, the scraping setal brush of the second maxilliped, is potentially of high interest. According to Van Dover et al. (1988) this brush in *R. exoculata* is used to scrape bacteria from the more anterior appendages (the first two pereopods and the third maxilliped), and although the evidence to date remains somewhat equivocal, *R. exoculata* may depend mostly or even exclusively on vent bacteria for nutrition (see Van Dover et al. 1988, Casanova et al. 1993, Gebruk 1993, Segonzac et al. 1993, Van Dover 1995). Thus, this character may be an important generic character separating the two genera on morphological as well as ecological and functional grounds.

The new species differs from *R. exoculata* in ecology, coloration, and morphology. *Rimicaris aurantiaca* prefers an ambient temperature of about 10°C compared to a higher ambient temperature of 28°C preferred by *R. exoculata* (Nuckley et al. 1996); they are also less active within a swarm than are individuals of *R. exoculata* and are only rarely seen swimming singly

in the water column. According to Nuckley et al. (1996), "the small orange shrimp aggregates in swarms of hundreds, probably thousands of individuals on the sides of black smoker chimneys at the Beehive Mound of the Snake Pit site at a depth of 3500 meters."

Coloration is markedly different, both from *R. exoculata* and from previously described species of *Chorocaris*, with the new species appearing bright orange compared to a drab whitish or gray color exhibited by *R. exoculata* and *Chorocaris*. The color appears to come from the numerous oil droplets visible through the cuticle of the shrimp, and indeed upon dissection the shrimp exudes some of these droplets, which remain orange-colored. Although Creasey et al. (1996) attribute the orange coloration to the presence of "an oily, lipid-rich hepatopancreas," the oil droplets obviously occur in areas where no hepatopancreas is found, as well as in the region of the hepatopancreas. Photographs in Nuckley et al. (1996: 101, fig. 2A–C) show the orange coloration and the difference in color from the sympatric and light gray colored *R. exoculata* very clearly. It is interesting to note that in the description of *Opaepele loihi* from hydrothermal vents on the Loihi Seamount of Hawaii, Williams & Dobbs (1995) refer to the color of that species as "intensely orange (astaxanthin pigment)," although in the case of *O. loihi* the color comes apparently from an accumulation of particles of iron oxyhydroxide (Williams & Dobbs 1995).

Morphological differences in the new species include a "normal" (not greatly inflated) carapace; eyestalks that, although reduced and fused medially, are closer to the original caridean eyestalk condition and are at least recognizable as such; a frontal region that does not form a protective operculum with the carapace; a third maxilliped composed of three longer and two shorter articles; and a small, blunt rostrum. All of these characters are more consistent with previous descriptions of species in the ge-

nus *Chorocaris* Martin & Hessler, 1990. Indeed, if we employ the most recent key to the genera of the Bresiliidae (Williams & Dobbs 1995) the new species keys out as a member of the genus *Chorocaris*. The characters that Martin & Hessler (1990) used to distinguish *Rimicaris* from their newly described genus *Chorocaris* seem to be, for the most part, unique to *R. exoculata*.

*Rimicaris aurantiaca* had been observed previously by Segonzac et al. (1993), who referred to the Beehive Mound at this site as being "densely covered with adult *Rimicaris* and juveniles identified by their red color" (English translation). At least some of these "juveniles" we now know to represent this new species, and this was in fact suspected by Segonzac et al., who noted, in an addendum to that paper, that a "new species with features intermediate between *Rimicaris exoculata* and *Chorocaris chacei*" was present at this site, and that the juvenile stages were very similar in the three species. However, there are sufficient differences between adult *R. exoculata* and *R. aurantiaca* that there can be no doubt as to their separate identity.

Special mention should be made of the recent study by Creasey et al. (1996) on genetic composition of populations of *R. exoculata*. In that paper, the following mention is made of the new species: "... Within the Snake Pit vent field, small shrimp with an orange colouration due the presence of an oily, lipid-rich hepatopancreas have been observed within swarms of *R. exoculata*" (Creasey et al. 1996: 474). In that same paragraph these authors refer to the small orange Snake Pit species (undoubtedly *R. aurantiaca*) as *Chorocaris* sp., citing Van Dover (1995). However, it should be pointed out that Creasey et al. (1996) did not use any Snake Pit specimens in their comparison, and that the specimens they refer to in the remainder of their paper as *Chorocaris* sp. were from the TAG and Broken spur sites and therefore are attributable to *Chorocaris fortunata* Martin & Christiansen, 1995. Thus their conclusion

“that all morphotypes of *R. exoculata* examined, including those previously interpreted as representing separate species, are conspecific” does not apply to *R. aurantiaca*, but rather only to the two different populations of *R. exoculata* at the TAG and Broken Spur sites, the latter of which had been suggested by Murton et al. (1995) to contain a different species of *Rimicaris* based on slight morphological differences.

The somewhat intermediate assemblage of characters (i.e., some shared with *R. exoculata* and others with species of *Chorocaris*) might justify creation of yet another bresiliid shrimp genus from the hydrothermal vents. We refrain from doing so in this paper, believing that discovery of additional species is almost certainly forthcoming and will shed light on the entire assemblage, and that a conservative approach is warranted until such time that more is known. In the meantime we recognize that the generic diagnosis for *Rimicaris* as emended in this paper leaves it a rather poorly delimited genus on morphological grounds, as it must be to accommodate two shrimp species that exhibit so many morphological differences.

Unfortunately, description of the new species does not add appreciably to the body of information that would eventually lead to recognition or rejection of the family Alvinocarididae, as proposed by Christofferson (1989) and employed by Christofferson (1991) and Saint Laurent (1993, in Segonzac et al. 1993) to accommodate the genera and species of bresiliids known from hydrothermal vents and cold seeps. Thus, as have Martin & Hessler (1990), Chace (1992), Holthuis (1993), Williams & Dobbs (1995), Martin & Christiansen (1995), and Van Dover (1995), we retain the older, albeit recognized to be somewhat artificial, limits of the caridean family Bresiliidae.

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